

Appl. No. 10/686,357  
AMENDMENT FILED CONCOMITANT WITH RCE

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REMARKS/ARGUMENTS

AUG 04 2006

Claims 1-3 remain rejected under 35 USC 103 over JP 6-264185 on the reasoning that differences between the invention as claimed and the art are obvious.

Applicants respectfully disagree. The Examiner agrees that there are differences between the elements of claims 1 through 3 and the cited art. Applicants submit that those differences include the following missing elements in the art.

(Claims 1 and 2)

(1) C<0.06, Mo: 0.05 - 0.6; Ti: 0.02 - 0.10  
 $0.8 < (C/12) / [(Ti/48) + (Mo/96)] < 1.3$

(2) Cr: none

(Claim 3)

(3) C: 0.06 - 0.15; Ma: 0.3 - 0.7; Ti: 0.10 - 0.35  
 $0.8 < (C/12) / [(Ti/48) + (Mo/96)] < 1.3$

(4) Cr: none

In the last AMENDMENT, the Examiner took the position that the differences did not overcome the *prima facie* obviousness rejection, without evidence of a special effect. As explained below, evidence is already in the record.

According to the cited reference, the ratio of C, Ti and Mo of the Steel type D in Table 2 is 1.58 (as the Examiner states),

Appl. No. 10/686,357  
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being out of the range of claims of the present application, and Cr is added in a large amount of 0.86% and is out of the range of claim of the present application.

Further, with the cited reference, C content of the Steel type E in Table 2 is in a range of C<0.06 while, Ti content is 0.143, which is out of the range of claims of the present application and moreover, Cr is included in a large amount of 0.91% which is also out of the range of claims of the present application.

The above-mentioned composition elements of the present invention are not shown or suggested from the content disclosed in the cited reference. Evidence of unexpectedly improved results can be found in the specification as follows.

The invention is disclosed to improve workability by setting up a structure for "strengthening of precipitation by ferrite single phase + fine precipitates" and does not include, in principle, a hard second phase. Also, precipitates are compound carbides which include Ti and Mo and it is previously unknown or expected that such a complex compound described above makes precipitates fine and stabilized. For obtaining fine compound precipitates mentioned above, precise control of the ratio of C, Ti and Mo, as defined by claims of the present application, is required.

Appl. No. 10/686,357  
AMENDMENT FILED CONCOMITANT WITH RCE

In contrast, the cited reference is basically composed of a dual-phase of a ferrite-pearlite phase or a ferrite-martensite phase, as set out in [0007], and there is specifically recited claim 1, "martensite at a volume fraction of 5 to 15%". As set out in [0015], addition of Cr and Mo is indispensable for securing such a compound structure mentioned above and because the formation of precipitates is not defined, addition of Cr is unavoidable, whereas positive addition is not defined according to the present application, and besides, the addition of Mo has different significance. The cited reference provides evidence of this, e.g. at the description in [0019] of JP 6-264185, stating that "TiC is precipitated." This is a clear statement that the precipitates are not compound precipitates containing Mo, but are conventionally known TiC. The cited art does not teach anything but that which was known in the art and not the present invention.

That is to say, although the magnitude of differences in terms of composition between the present application and the cited reference may not appear significant, the result of such differences are significant. The effects which are obtainable with the requirement of composition of the present application claims are extensive and if, as in a case of the cited reference, a large amount of Cr is added or the ratio of addition of C, Ti

Appl. No. 10/686,357  
AMENDMENT FILED CONCOMITANT WITH RCE

and Mo deviates from the range of the addition ratio of the present application, the effects (effects of strengthening, which secures affluent workability, by compound and fine precipitates of carbides of ferrite single-phase + TiMo) are unable to be obtained.

The importance of this is the unexpectedly good properties imparted to the steel with a reduction in the amount added of additional components. Because of the differences of structures and precipitates, when Steel E(0.047%C-0.01%Si-1.62%Mn-0.91%Cr-0.05%Mo-0.143%Ti) in Table 2 of the cited reference is compared with Steel A(0.045%C-0.05%Si-1.67%Mn-0.056%Cr-0.20%Mo-0.085%Ti), tabulated in Table 1 of the present application, having a composition similar to that of the above mentioned Steel E, except a ratio of Mo and Ti and a Cr content, TS of Steel E is 716MPa at most while the value of Steel A of the present application is 821MPa, which is more than 100MPa higher. This indicates that in securing the same strength for a steel of the present application, a total amount of additional elements, starting with C, can be reduced to an amount, inasmuch as the amount remains within the range of the present application, and said decrease of the total additional amounts is considered to be extensively advantageous for not only curtailment of manufacturing costs but also from the viewpoint of weldability

Appl. No. 10/686,357  
AMENDMENT FILED CONCOMITANT WITH RCE

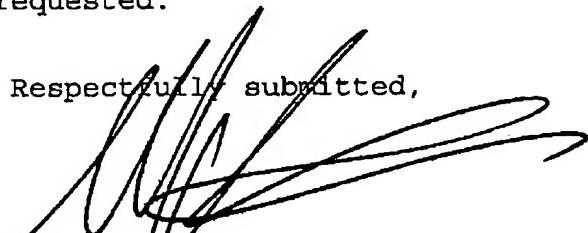
and delayed fracture, for which an increase of C in particular is said to be not desirable.

As has been explained above with a comparison with the cited reference, the technical concept of the present application is fundamentally different from that of the cited reference. When claims and inventive examples of the cited reference are studied, the specified condition of composition of the cited reference not within the requirements of the present application. Therefore, the present invention is not shown or suggested by the cited art.

Withdrawal of the rejections and allowance of the application are respectfully requested.

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